Math Lesson – The Right Shoes

Outcomes or Learning Goals

- Solve problems involving fractions and percentages in practical situations (9)
- Solve problems involving money drawn from everyday situations (9)
- Write money values, using correct units (9)
- Demonstrate the effective use of a calculator in operations with decimals and percentages (9/10)
- Communicate information about money sense (10)
- Verbalize their observations and reflections regarding money sense and ask questions to clarify their understanding (10)
- Explain their reasoning used in problem solving and in judging reasonableness (9/10)
- Develop, select, and apply problem-solving strategies while posing and solving problems (9/10)

Grade Levels 7-10

MAT1LZ – Locally Developed Math grade 9

MAT2LZ – Locally Developed Math grade 10

Context & Rationale

In the book *The Right Shoes*, students read about Lara, a student who is shopping for one pair of shoes and decides to base her decision on prices that are discounted. Students such as Lara are striving to become informed shoppers, and they need to learn that products have a regular price and often go on sale at a discount. Knowing how a sale price is calculated helps them to make good decisions when shopping with a budget in mind. The concepts from this lesson transfer quickly to students' everyday shopping needs and are particularly important for students with limited prior formal schooling.

Please note: Some students in the class currently may not be prepared with prerequisite studies of fractions, decimals, and percent. The teacher, however, may choose to teach the calculator steps for discount and sale price in order that the students quickly develop efficient shopping skills for everyday needs. In the meantime, they may also continue to work on the building important foundational mathematical concepts at an appropriate pace.

Related Topics/Units

The story *The Right Shoes* presents a scenario where a shopping decision is based on need, preference, and price. The shoes under consideration for purchase are on sale. Once the discount is calculated and the sale price is determined, the sale prices are compared and the decision is made.

As students use the related picture prompts to create their own problems to solve, specific mathematical skills and financial concepts are likely to be targeted, such as the use of decimals and appropriate operations on a calculator; the relationship of decimals, fractions, and percentages; applications of multiplication and subtraction; and the use of multi-step problems. The teacher can adapt these problems based on the differentiation needs within the class as well as use them to introduce, practise, review, or consolidate concepts. Once students learn about regular prices and sale prices, further topics can be explored such as planning a budget, shopping wisely within a budget, using comparative shopping skills, and planning specific purchases for the best times of the week, season, or year.

Number Sense and Numeration Skills from the *Ontario Elementary Mathematics Curriculum* that link well to this lesson:

- Read and represent money amounts to $100 (gr. 4)
- Represent , compare and order decimal numbers to tenths (gr. 4)
- Round decimal numbers to the nearest tenth, in problems arising from real-life situations (gr. 5)
- Read and write money amounts to $1000 (e.g., $455.35 ie. 455 dollars and 35 cents, or four hundred fifty-five dollars and thirty-five cents) (gr. 5)
- Add and subtract decimal numbers to hundredths, including money amount, using concrete materials, estimation, and algorithms (gr. 5)

Useful Resources

Ministry of Education Ontario: *Gap Closing Resource* (www.edugains.ca). This resource includes a diagnostic assessment to help teachers identify areas of need and provides instructional strategies to build essential numeracy skills.
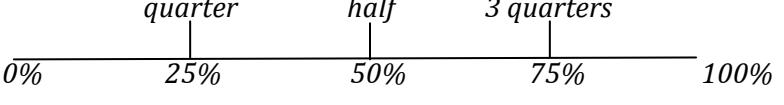
Ministry of Education Ontario: Guides to Effective Instruction in Mathematics, Grade 4-6:

Volume 1: ***Big Ideas*** for an explanation of the key concepts in number sense and numeration across the junior grades, as well as appropriate models and tools that support students in understanding these concepts

Volume 5: ***Fractions*** for an explanation of the mathematical models and instructional strategies that support student understanding of fractions

Volume 6: ***Decimals*** for an explanation of the mathematical models and instructional strategies that support student understanding of decimals

Lesson Sequence

Part 1 Minds on/Prior Learning (15 - 20 minutes)	What to Prepare
### Activity Remind students of the book they read, *The Right Shoes.* Tell them they will be making and solving math problems by using some ideas from the story. Ask – Has anyone ever seen advertisements such these, or signs in a store that say "25% off"? Does anyone know what they mean? Allow students to provide some personal examples or share questions they have about discount and percent. Provide a simple example: A jacket costs $28.00, regular price. It is on sale for 50% off. What does that mean? (Implied language – 50% off **the original price**) Give students a few moments to discuss with elbow partner, than ask someone to share with the class. *(It is one-half off, that would be $14 off, and you would pay 28-14 = 14.)* What would it cost if it is on sale for 25% off? *(Students might think, 25 is half of 50, so half of 14 is 7. You would pay 28 – 7 = 21.)* Give students a few more moments to discuss with elbow partner and then share. *Co-construct a reference line as a visual reference:* quarter half 3 quarters 0% 25% 50% 75% 100% *(**Please note**: If you have a student who uses a calculator to solve this question, ask him/her to demonstrate how to do this for the class.)* Begin the "*The Right Shoes* Math Prompts" to activate prior knowledge and to facilitate the creation of the math problems for the lesson. If desired, the teacher may use the following prompts with the slides.	• A few ads from flyers that show regular price, discount as a percent, and sale price • Calculators for partners • Math manipulatives and models such fraction/decimal/ percent comparison cube towers and circles • Accompanying "*The Right Shoes* Math Prompts" • Display board and/or chart paper and markers • Students seated with an elbow partner **Prior Knowledge Needed:** • Writing money with $ and decimal points • Understanding of subtraction and multiplication • Understanding of one-half • Understanding of the relationship one-half and 50%, 25% • Subtracting and multiplying decimals on a calculator

Part 1 Minds on/Prior Learning (15 - 20 minutes)	What to Prepare
## Activity **Slide #2** Ask a student to review the story of Lara and her shoe decision. **Slide #3** What information do we have about the backpack? **Slide #4** What have we added? **Slide #5** The teacher may choose to stop here and ask the students, *What math questions come to mind? (Tell students to discuss only prices that are **before added taxes**.)* Sample responses to anticipate: (varying levels of difficulty) *What is the cost of the backpack?* *What is the sale price total of the backpack and necklace?* *How much money do I need to buy the backpack, necklace and running shoes?* *How much money do I save by buying each item on sale?* **To provide more challenge**, *Slides #6 c*an be added. The questions that might be anticipated here: *If I have $40, which of the items could I buy?* *If I have $40, how much more/less would I need to buy ___ ?* **Slide #7** *As a class, co-create the question(s) to be solved and post in an accessible location or record on Slide #7 to remain displayed.* **Differentiation needs:** For students who are struggling or requiring a more challenging question, the teacher can have the students use fewer or more slides to create a question. Consider choosing an alternate, easier parallel question for some students to explore.	
## Assessment Observe student remarks and questions during the Minds On discussion of the slides and creation of questions: • Do students understand "one-half" of 28 and 14? • Do students understand 50% and 25%? • What strategies are the students using to solve this problem? • During the question creation discussion, which students created an easy question or more challenging question? What might have been the factors influencing the students who created the easy questions? • What vocabulary strengths/needs are evident during the class discussion and partner talk?	Make a note of any students who will need additional support or would benefit from a more challenging amount/approach to the problem.

Part 1 Minds on/Prior Learning (15 - 20 minutes)	What to Prepare

Part 2 – Work on it (25 – 30 minutes)

Item	Regular Price	Discount	Work (will vary)	Sale Price
backpack	$55.00	25%	*$55 is almost $60* *25% is ¼ off or about $15 off.* *It will be less because I rounded up.*	About $41.00 $41.25
necklace	$48.00	15%	*48 X 15%* 48 x 10% =4.80 48 x 5% = 2.40 4.80 = 2.40= $7.20 48 – 7.20= $40.80	$40.80
running shoes	$65.00	40%	*Calculator* *65 x .4 (40%) = 26.00* *65 – 26 = $39.00*	$39.00

Before beginning work:

- Read/review/co-create appropriate terms for the math word wall. (*"on sale", discount, regular price, sale price, percent, etc.*)
- Show class various materials they might choose to use when solving their problem: *calculator, money, hundreds chart, base ten blocks BLM #1*
- Grid Chart Paper, markers

Keep Slide #7 displayed for student reference during the work period.

Activities During Work Period

- The teacher may choose to have the students work with a partner or in small groups, depending upon the composition of the class.
- Students work with partners on one of the questions. Prompt students to offer a reasonable answer that they can use for benchmarks such as 50% and 25% to help them check?
- Students record their work and final answer on chart paper. Grid chart paper works well when working with decimals and money.
- Teacher visits partners to clarify the question they are answering and remind students of the picture and information in the ad.
- Challenge students who solve their problem quickly to think a personal shopping "on sale" experience that they could record and share with the class.

Have extra sales flyers on hand for this step.

Part 1 Minds on/Prior Learning (15 - 20 minutes)	What to Prepare
### Assessment Allow students time to get started and then move around the room to observe each group. Listen to the discussion. • Are they using math vocabulary? ("*on sale", discount, regular price, sale price, percent, etc.*) • Note which students can select the most efficient strategy to solve the problem based on the context? • Do students know to subtract the discounted amount from the regular price? • Observe which groups use similar approaches/organization. Select varying examples to be shared in Part 3. i.e. proportional reason (25% of an amount), variety or representations and/or strategies.	

Part 3 – Conclude and Share Solutions (15 - 20 minutes)	
### Activity Bring the class back together. • Choose different groups to share their questions and answers, beginning with the easier questions. • Discuss with groups what their final answer is. How do they know it is right? Does it seem reasonable? • Ask students what was easy, what was difficult, and what they learned from the activity. • How were the strategies the same?... different? Was there a strategy that made the most sense to them? • Discuss the different ways students represented their thinking. Do they think they can try next time without the poster or the BLM#1?	
### Follow up Exit Ticket – Have each student change the question s/he worked on by changing the discount price i.e. backpack 15% off or 40% off, necklace 25% or 40 % off.	Exit Ticket: BLM #1

Part 3 – Conclude and Share Solutions (15 - 20 minutes)	
Assessment Check student results for Exit Ticket. • Did they use the calculator confidently and accurately? • What strategies did students use to find a discount – guess and test, or a benchmark of 50% or 25% to get started? • Did their choices of tested discounts seem reasonable? • Did students represent and/or calculate the amount of the discount correctly? • Did students know to subtract the discount from the regular price?	

Resources

• *"The Right Shoes"* Math Prompts
• BLM#1 The Right Shoes

BLM #1 The Right Shoes   **Back Pack**

Regular Price:_____

Discount:_____

Work Space: What is the final sale price?

BLM #1 The Right Shoes   **Necklace**

Regular Price:_____

Discount:_____

Work Space: What is the final sale price?

BLM #1 The Right Shoes   **Shoes**

Regular Price:_____

Discount:_____

Work Space: What is the final sale price?